

Quarterly Report
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I. Near-term Objectives

Extend the data analysis algorithm developed by Nakajima and King for determining the cloud optical thickness and effective radius of clouds to the MODIS processing system. Work is currently underway to adapt that analysis program, originally developed for the IBM 3081 computer and using MCR (Multispectral Cloud Radiometer) data, to the Cray YMP and MAS data.

Reconfigure MAS for incorporation of 50 channels, including the CO₂ slicing channels in the thermal infrared and numerous visible channels, not incorporated in the November FIRE cirrus configuration.

II. Task Progress

a. MAS FIRE Flights

Liam Gumley has been processing some of the FIRE aircraft data into level 1-B netCDF files for further analysis. Tom Arnold has been downloading some of the flight lines and displaying them on his Macintosh computer and printing out the images for a data notebook of quicklook products. Michael King presented these images at 2 different meetings in Colorado in February (FIRE Science Team Meeting, NCAR Research Aviation Fleet Workshop). Considerable interest was expressed in these images, as they showed considerable detail both in the visible and thermal infrared of cirrus clouds overlying lower cumuliform clouds over the Gulf of Mexico. Many scientists have contacted me to obtain copies of these data for their algorithm work and subsequent analysis. Much effort has likewise been expended by Si-Chee Tsay to convert our research data analysis code for determining cloud optical thickness and effective particle radius into a more professional code for data processing of MAS and subsequently MODIS data. This code has now successfully been run on the Cray YMP (it was originally developed for and executed on the

IBM 3081). Documentation on the data access, format, and availability of MAS data prepared by Liam Gumley has been distributed to all members of the cloud retrieval working group of the CERES Science Team (Bruce Wielicki, Pat Minnis, Jim Coakley, Larry Stowe, Ron Welch).

b. ASTEX and LEADEx Experiment

Preparations are underway to prepare and support the fully complete MAS which will fly from the ER-2 aircraft during the Atlantic Stratocumulus Transition Experiment (AXTEX), to be conducted from the Azores in June 1992. In addition, considerable work was expended in cleaning and replacing mechanical and optical elements, and in upgrading the electronic gain switching circuit for the Cloud Absorption Radiometer (CAR), in preparation for the upcoming Lead Experiment (LEADEx) to be conducted in the Beaufort Sea, Alaska in April 1992. The CAR was completely overhauled and cleaned, disassembled, and prepared for shipping to the University of Washington for integration on the C-131A aircraft.

c. Review Paper on the Radiative Properties of Clouds

An article was prepared on the Radiative Properties of Clouds, which has now been accepted for publication as a chapter in a book entitled, "Aerosol-Cloud-Climate Interactions," edited by P. V. Hobbs, to be published by Academic Press.

d. MODIS

Appointed Deputy Science Team leader on January 23, 1992. Subsequently chaired the twice-monthly MODIS Technical Team meeting, and regularly attended weekly MODIS Science Support Office meetings and monthly meetings with team leader Vince Salomonson. Have actively participated in defining the agenda for the MODIS Science Team meeting on April 14-16.

III. Anticipated Activities During the Next Quarter

a. LEADEx Experiment

Participate in the month-long deployment from Prudhoe Bay, Alaska, in which the University of Washington C-131A is a participant. Make radiation measurements in arctic haze and ice clouds, if present, and

measure the bidirectional reflectance function of sea ice to contrast it to clouds in polar regions.

a. ASTEX Experiment

Participate as flight scientist of the ER-2 for 4 weeks in the Azores Islands, Portugal in June 1992. This mission involves coordinated aircraft and satellite (NOAA/AVHRR and Landsat/TM) measurements of the radiative and microphysical properties of marine stratocumulus clouds. The instruments of interest to my research group in particular and MODIS in general consist of the MAS on the ER-2 and the CAR on the University of Washington C-131A, in addition to in situ microphysical measurements to be used for validation of remote sensing.

c. Brazil Biomass Burning Experiment

Yoram Kaufman and I are organizing a 1 day workshop at Goddard on May 20 involving the key participants in a MODIS land/atmosphere supported Brazil experiment. We have had several discussions already with key NASA Headquarters program managers (Janetos, Suttles, Wickland).

d. Data Processing

We are presently working on getting our software ready to easily process MAS data to be obtained in ASTEX, using the level 1-B netCDF files to be provided by Liam Gumley.

IV. Problems/Corrective Actions

No problems that we are aware of at this time.

V. Publications

King, M. D., Y. J. Kaufman, W. P. Menzel and D. Tanre, 1992: Remote sensing of cloud, aerosol, and water vapor properties from the Moderate Resolution Imaging Spectrometer (MODIS). IEEE Trans. Geosci. Remote Sens., 30, 2-27.

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